

## REMARKS

Claims 1-10 are now pending in this application. The following remarks are in response to the Office Action mailed April 20, 2004.

In the previous office action, mailed September 26, 2003, the Patent Office stated that claims 6-10 would be allowable if re-written in independent form. Those claims were re-written in independent form in applicants' response filed January 26, 2004. Since the present Office Action does not treat claims 6-10 separately from claim 1, applicants are confused regarding the specific grounds on which (previously allowable) claims 6-10 have been rejected. Clarification is respectfully requested.

Claims 1-10 now stand rejected under 35 U.S.C. § 103 as unpatentable over U.S. Pat. No. 6,012,042, to Black et al. in view of U.S. Pat. No. 5,444,819, to Negishi and further in view of Castiglione, F., "Forecasting price increments using an artificial Neural Network." This rejection is respectfully traversed.

The subject application has a priority date of April 7, 2000. The article by Castiglione, as far as applicants have been able to determine, was published in March 2001 (see attached printouts from the Internet). If the Patent Office can demonstrate a publication date of the Castiglione article that is earlier than April 7, 2000, it is invited to do so. Otherwise, the claim rejections based on Castiglione should be withdrawn. Applicants reserve the right to substantively address the Castiglione reference (or to swear behind it) if the Patent Office provides evidence that Castiglione was published early enough to qualify as prior art.

Further, although applicants appreciate the Patent Office's admission that Black and Negishi, even if combined, do not render the pending claims unpatentable, the Office Action fails to provide sufficient justification for combining any of the three cited references. The Office Action states:

Because Black includes within the invention's process the technical analysis of price data . . . , it would have been obvious for an artisan of ordinary skill at the time of the invention of Black to integrate/substitute the pattern recognition processor and curve fitting technique, disclosed within Negishi and Castiglione, as alternatives to the Black's price data analysis, because an artisan at the time of the invention would have been motivated to use these techniques, being the latest forecasting technology, to effectively analyze market price data and find new market trends. Moreover to provide such techniques would further

allow the user to make the best financial decision and thus is an obvious expedient well within the ordinary skill in the art.

The assertions quoted above are problematic for at least a couple of reasons.

First, there is no “pattern recognition processor and curve fitting technique” “disclosed within Negishi and Castiglione.” Negishi discloses a “pattern sorting unit” and Castiglione (although it does not appear to be prior art) discloses a curve fitting technique – but neither Negishi nor Castiglione, separately, discloses a “pattern recognition processor and curve fitting technique.” The Patent Office is implicitly trying to combine Black with a *combination* of Negishi and Castiglione. And before alleging that one skilled in the art would be motivated to combine the teachings of Black with a combination of Negishi and Castiglione, the Patent Office must first establish a motivation to combine Negishi with Castiglione. No such motivation is established, or even asserted, in the Office Action.

Second, the asserted “motivations” for combining Black with the combination of Negishi and Castiglione are not supported in the references. None of the references suggest that Black would be improved by substituting the teachings of Negishi or the teachings of Castiglione (either separately or in combination) for Black’s “price data analysis.” Nor do any of the references suggest that the teachings of Negishi (which occurred in Japan in 1992), if combined with the teachings of Castiglione (which apparently occurred in 2001), would be “the latest forecasting technology” relative to the teachings of Black (which occurred in 1995). Indeed, the Office Action doesn’t explain what is meant by “latest” – latest with respect to which reference?

Likewise, there is no indication in the cited references that combining Black with a combination of Negishi and Castiglione would enable a user to “make the best financial decision.” Indeed, it is not clear that combining Black with a combination of Negishi and Castiglione would even result in an *operable* system or method, much less an *optimal* system or method.

The Office Action language quoted above is not sufficient to establish a *prima facie* case of obviousness. The alleged suggestion or motivation to combine Black with a combination of Negishi and Castiglione must be based on objective evidence in the record. See MPEP 2143.01 and *In re Lee*, cited therein (copy enclosed). Moreover, as discussed above, to support its rejections the Patent Office must separately establish a motivation to combine Negishi with Castiglione – and the Office Action does not even attempt to do that.

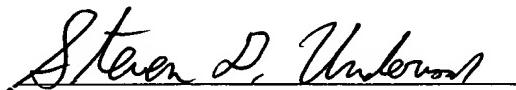
There are other problems with the Office Action (for example, the characterizations of Negishi and Castiglione, and what a "combination" of those references would result in), but for the sake of efficiency applicants forgo discussing those problems until the Patent Office provides evidence showing that Castiglione is prior art.

All claim rejections are believed to have been overcome by this Response. All pending claims are therefore believed to be allowable, and a prompt Notice of Allowance would be appreciated.

No fee is believed to be due with this Response.. Please charge any fee insufficiencies to Deposit Account No. 50-0310.

Respectfully submitted,

Dated: July 19, 2004



Steven D. Underwood, Esq.  
Registration No. 47,205  
MORGAN, LEWIS & BOCKIUS LLP  
101 Park Avenue  
New York, NY 10178-0060  
(212) 309-6000

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representation of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

## **IMAGES ARE BEST AVAILABLE COPY**

**As rescanning documents *will not* correct  
images, please do not report the images to the  
Image Problem Mailbox.**



**WorldSciNet**  
www.worldscinet.com



[What's New](#) | [New Journals](#) | [Browse Journals](#) | [Search](#) | [For Authors](#) | [How To Order](#) |  
[Contact Us](#) | [Free Table of Contents](#) | [Email Updates](#) | [Download Acrobat Reader](#) | [Free Sample Issues](#) |  
[Advertising Enquiries](#) | [Journal Prices](#)

**WorldSciNet**  
www.worldscinet.com

## ADVANCES IN COMPLEX SYSTEMS

*Vol. 4, No. 1 (March 2001)*

### CONTENTS

<u>Guest Editors' Introduction</u> <i>F. Schweitzer and D. Helbing</i>	1
<u>Trading Behavior and Excess Volatility in Toy Markets</u> <i>M. Marsili and D. Challet</i>	3
<u>Percolation Models of Financial Market Dynamics</u> <i>D. Stauffer</i>	19
<u>Multi-Agent Market Modeling of Foreign Exchange Rates</u> <i>G. Zimmermann, R. Neuneier and R. Grothmann</i>	29
<u>Forecasting Price Increments Using an Artificial Neural Network</u> <i>F. Castiglione</i>	45
<u>Spectral Regularization, Data Complexity and Agent Behavior</u> <i>A. Ilyinsky</i>	57
<u>Dynamics of Economic and Technological Search Processes in Complex Adaptive Landscapes</u> <i>W. Ebeling, Karmeshu and A. Scharnhorst</i>	71
<u>New Results in a Self-Organized Model of Technological Evolution</u> <i>A. Arenas, A. Diaz-Guilera, X. Guardiola, M. Llas, G. Oron, C. J. Perez and F. Vega-Redondo</i>	89

<u>Firms Decision Making Process in an Evolutionary Model of Industrial Dynamics</u> <i>W. Kwasnicki</i>	101
<u>The Evolution of Industrial Clusters - Simulating Spatial Dynamics</u> <i>T. Brenner and N. Weigelt</i>	127
<u>The Growth Dynamics of German Business Firms</u> <i>J. Voit</i>	149
<u>A Dynamic Theory of a Firm: An Application of 'Economic Forces'</u> <i>M. Estola</i>	163

[Back to ACS](#)



[What's New](#) | [New Journals](#) | [Browse Journals](#) | [Search](#) | [For Authors](#) | [How To Order](#) |  
[Contact Us](#) | [Free Table of Contents Email Updates](#) | [Download Acrobat Reader](#) | [Free Sample Issues](#) |  
[Advertising Enquiries](#) | [Journal Prices](#)

Advances in Complex Systems, Vol. 4, No. 1 (2001) 45-56

© World Scientific Publishing Company

[doi:10.1142/S0219525901000097](https://doi.org/10.1142/S0219525901000097)



## FORECASTING PRICE INCREMENTS USING AN ARTIFICIAL NEURAL NETWORK

FILIPPO CASTIGLIONE

*Center for Advanced Computer Science, University of Cologne, ZPR/ZAIK, Weyertal 80, D-50931 Köln,  
Germany*

*E-mail: [filippo@zpr.uni-koeln.de](mailto:filippo@zpr.uni-koeln.de)*

Financial forecasting is a difficult task due to the intrinsic complexity of the financial system. A simplified approach in forecasting is given by "black box" methods like neural networks that assume little about the structure of the economy. In the present paper we relate our experience using neural nets as financial time series forecast method. In particular we show that a neural net able to forecast the sign of the price increments with a success rate slightly above 50% *can* be found. Target series are the daily closing price of different assets and indexes during the period from about January 1990 to February 2000.

**Keywords:** Forecasting, neural networks, financial time series, detrending analysis.

---

[\*\*PDF SOURCE \(684 k\)\*\*](#)

---

[Back to Contents of Vol. 4, No. 1](#)

▷

United States Court of Appeals,  
Federal Circuit.

In re SANG-SU LEE.

No. 00-1158.

Jan. 18, 2002.

Board of Patent Appeals and Interferences rejected all claims of inventor's patent application directed toward method of automatically displaying functions of video display device that demonstrated how to select and adjust functions in order to facilitate response by user. Inventor appealed. The Court of Appeals, Pauline Newman, Circuit Judge, held that analysis by Board did not comport with either legal requirements for determination of obviousness or with requirements of Administrative Procedure Act (APA).

Vacated and remanded.

West Headnotes

**[1] Patents** ↗113(6)  
291k113(6) Most Cited Cases

Tribunals of the Patent and Trademark Office (PTO) are governed by the Administrative Procedure Act (APA), and their rulings receive the same judicial deference as do tribunals of other administrative agencies. 5 U.S.C.A. § 551 et seq.

**[2] Administrative Law and Procedure** ↗485  
15Ak485 Most Cited Cases

**[2] Administrative Law and Procedure** ↗507  
15Ak507 Most Cited Cases

For judicial review to be meaningfully achieved within the strictures of the Administrative Procedures Act (APA), an agency tribunal must present a full and reasoned explanation of its decision; the agency tribunal must set forth its findings and the grounds thereof, as supported by the agency record, and explain its application of the law to the found facts. 5 U.S.C.A. § 706(2).

**[3] Patents** ↗113(6)  
291k113(6) Most Cited Cases

Judicial review of a decision of the Board of Patent Appeals and Interferences denying an application for a patent is founded on the obligation of the agency to make the necessary findings and to provide an administrative record showing the evidence on which the findings are based, accompanied by the agency's reasoning in reaching its conclusions. 5 U.S.C.A. § 551 et seq.

**[4] Patents** ↗31.1  
291k31.1 Most Cited Cases

As applied to the determination of patentability vel non when the issue is obviousness, it is fundamental that the rejection of a patent application must be based on evidence comprehended by the language of the statute addressing obviousness. 35 U.S.C.A. § 103.

**[5] Patents** ↗16.5(1)  
291k16.5(1) Most Cited Cases

The patent examination process centers on prior art and the analysis thereof; when patentability turns on the question of obviousness, the search for and analysis of the prior art includes evidence relevant to the finding of whether there is a teaching, motivation, or suggestion to select and combine the references relied on as evidence of obviousness. 35 U.S.C.A. § 103.

**[6] Patents** ↗26(1)  
291k26(1) Most Cited Cases

In the context of an obviousness determination by the Board of Patent Appeals and Interferences, the factual inquiry whether to combine references must be thorough and searching; it must be based on objective evidence of record. 35 U.S.C.A. § 103.

**[7] Patents** ↗111  
291k111 Most Cited Cases

Analysis of invention by Board of Patent Appeals and Interferences did not comport with either legal requirements for determination of obviousness or with requirements of Administrative Procedure Act (APA) on basis that agency tribunal did not set forth findings and explanations needed for reasoned decisionmaking; examiner used conclusory statements to support his subjective belief that it was obvious that person skilled in the art would have been motivated to combine prior art, and Board rejected

need for any specific hint or suggestion in particular reference to support combination of prior art. 5 U.S.C.A. § 706(2); 35 U.S.C.A. § 103.

**[8] Patents** ↗ 26(1)  
291k26(1) Most Cited Cases

In an obviousness determination, the factual question of motivation to combine prior art is material to patentability, and cannot be resolved on subjective belief and unknown authority. 35 U.S.C.A. § 103.

**[9] Patents** ↗ 26(1)  
291k26(1) Most Cited Cases

**[9] Patents** ↗ 111  
291k111 Most Cited Cases

In an obviousness determination under patent law, it is improper, in determining whether a person of ordinary skill would have been led to combine references, simply to use that which the inventor taught against its teacher; thus, the Board of Patent Appeals and Interferences must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion. 5 U.S.C.A. § 706(2); 35 U.S.C.A. § 103.

**[10] Administrative Law and Procedure** ↗ 507  
15Ak507 Most Cited Cases

Deferential judicial review under the Administrative Procedure Act (APA) does not relieve the agency of its obligation to develop an evidentiary basis for its findings; to the contrary, the APA reinforces this obligation. 5 U.S.C.A. § 706(2).

**[11] Administrative Law and Procedure** ↗ 763  
15Ak763 Most Cited Cases

**[11] Administrative Law and Procedure** ↗ 796

15Ak796 Most Cited Cases

In the context of judicial review under the Administrative Procedure Act (APA), a decision by an agency tribunal that has an omission of a relevant factor required by precedent is both legal error and "arbitrary agency action." 5 U.S.C.A. § 551 et seq.

**[12] Administrative Law and Procedure** ↗ 485  
15Ak485 Most Cited Cases

**[12] Administrative Law and Procedure** ↗ 760  
15Ak760 Most Cited Cases

The foundation of the principle of judicial deference under the Administrative Procedures Act (APA) to the rulings of agency tribunals is that the tribunal has specialized knowledge and expertise, such that when reasoned findings are made, a reviewing court may confidently defer to the agency's application of its knowledge in its area of expertise; however, reasoned findings are critical to the performance of agency functions and judicial reliance on agency competence. 5 U.S.C.A. § 706(2).

**[13] Patents** ↗ 16(1)  
291k16(1) Most Cited Cases

The determination of patentability on the ground of unobviousness is ultimately one of judgment; in furtherance of the judgmental process, the patent examination procedure serves both to find, and to place on the official record, that which has been considered with respect to patentability. 35 U.S.C.A. § 103.

**[14] Patents** ↗ 16(3)  
291k16(3) Most Cited Cases

**[14] Patents** ↗ 104  
291k104 Most Cited Cases

**[14] Patents** ↗ 111  
291k111 Most Cited Cases

In the context of an obviousness determination, the patent examiner and the Board of Patent Appeals and Interferences are deemed to have experience in the field of the invention; however, this experience, insofar as applied to the determination of patentability, must be applied from the viewpoint of the person having ordinary skill in the art to which said subject matter pertains. 35 U.S.C.A. § 103.

**[15] Patents** ↗ 104  
291k104 Most Cited Cases

In finding the relevant facts, in assessing the significance of the prior art, and in making the ultimate determination of the issue of obviousness, the examiner and the Board of Patent Appeals and Interferences are presumed to act from the viewpoint of a person having ordinary skill in the art to which the subject matter pertains; thus, when they rely on what they assert to be general knowledge to negate

patentability, that knowledge must be articulated and placed on the record and the failure to do so is not consistent with either effective administrative procedure or effective judicial review. 5 U.S.C.A. § 706(2); 35 U.S.C.A. § 103.

**[16] Patents**  111  
291k111 Most Cited Cases

In the context of an obviousness determination, the Board of Patent Appeals and Interferences cannot rely on conclusory statements when dealing with particular combinations of prior art and specific claims, but must set forth the rationale on which it relies. 5 U.S.C.A. § 706(2); 35 U.S.C.A. § 103.

**[17] Administrative Law and Procedure**  326  
15Ak326 Most Cited Cases

**[17] Administrative Law and Procedure**  485  
15Ak485 Most Cited Cases

**[17] Administrative Law and Procedure**  507  
15Ak507 Most Cited Cases

Sound administrative procedure requires that an agency apply the law in accordance with statute and precedent; the agency tribunal must make findings of relevant facts, and present its reasoning in sufficient detail that the court may conduct meaningful review of the agency action. 5 U.S.C.A. § 706(2).

**Patents**  328(2)  
291k328(2) Most Cited Cases

4,626,892. Cited As Prior Art.  
\*1340 Richard H. Stern, of Washington, DC, argued for Sang Su Lee. With him on the brief was Robert E. Bushnell.

Sidney O. Johnson, Jr., Associate Solicitor, of Arlington, Virginia, argued for the Director of the U.S. Patent and Trademark Office. With him on the brief were John M. Whealan, Solicitor, and Raymond T. Chen, Associate Solicitor. Of counsel were Maximilian R. Peterson and Mark Nagumo, Associate Solicitors.

Before PAULINE NEWMAN, CLEVINGER, and DYK, Circuit Judges.

PAULINE NEWMAN, Circuit Judge.

Sang-Su Lee appeals the decision of the Board of Patent Appeals and Interferences of the United States Patent and Trademark Office, rejecting all of the claims of Lee's patent application Serial No. 07/631,210 entitled "Self-Diagnosis and Sequential-Display Method of Every Function." [FN1] We vacate the Board's decision for failure to meet the adjudicative standards for review under the Administrative Procedure Act, and remand for further proceedings.

**[FN1]** *Ex parte Lee*, No.1994-1989 (Bd. Pat.App. & Int. Aug. 30, 1994; on reconsid'n Sept. 29, 1999).

**The Prosecution Record**

Mr. Lee's patent application is directed to a method of automatically displaying the functions of a video display device and demonstrating how to select and adjust the functions in order to facilitate response by the user. The display and demonstration are achieved using computer-managed electronics, including pulse-width modulation and auto-fine-tuning pulses, in accordance with procedures described in the specification. Claim 10 is representative:

10. A method for automatically displaying functions of a video display device, comprising: determining if a demonstration mode is selected; if said demonstration mode is selected, automatically entering a picture adjustment mode having a picture menu screen displaying a list of a plurality of picture functions; and automatically demonstrating selection and adjustment of individual ones of said plurality of picture functions.

The examiner rejected the claims on the ground of obviousness, citing the combination of two references: United States Patent No. 4,626,892 to Nortrup, and the Thunderchopper Helicopter Operations \*1341 Handbook for a video game. The Nortrup reference describes a television set having a menu display by which the user can adjust various picture and audio functions; however, the Nortrup display does not include a demonstration of how to adjust the functions. The Thunderchopper Handbook describes the Thunderchopper game's video display as having a "demonstration mode" showing how to play the game; however, the Thunderchopper Handbook makes no mention of the adjustment of picture or audio functions. The examiner held that it

would have been obvious to a person of ordinary skill to combine the teachings of these references to produce the Lee system.

Lee appealed to the Board, arguing that the Thunderchopper Handbook simply explained how to play the Thunderchopper game, and that the prior art provided no teaching or motivation or suggestion to combine this reference with Nortrup, or that such combination would produce the Lee invention. The Board held that it was not necessary to present a source of a teaching, suggestion, or motivation to combine these references or their teachings. The Board stated:

The conclusion of obviousness may be made from common knowledge and common sense of a person of ordinary skill in the art without any specific hint or suggestion in a particular reference.

Board op. at 7. The Board did not explain the "common knowledge and common sense" on which it relied for its conclusion that "the combined teachings of Nortrup and Thunderchopper would have suggested the claimed invention to those of ordinary skill in the art."

Lee filed a request for reconsideration, to which the Board responded after five years. The Board reaffirmed its decision, stating that the Thunderchopper Handbook was "analogous art" because it was "from the same field of endeavor" as the Lee invention, and that the field of video games was "reasonably pertinent" to the problem of adjusting display functions because the Thunderchopper Handbook showed video demonstrations of the "features" of the game. On the matter of motivation to combine the Nortrup and Thunderchopper references, the Board stated that "we maintain the position that we stated in our prior decision" and that the Examiner's Answer provided "a well reasoned discussion of why there is sufficient motivation to combine the references." The Board did not state the examiner's reasoning, and review of the Examiner's Answer reveals that the examiner merely stated that both the Nortrup function menu and the Thunderchopper demonstration mode are program features and that the Thunderchopper mode "is user-friendly" and it functions as a tutorial, and that it would have been obvious to combine them.

Lee had pressed the examiner during prosecution for some teaching, suggestion, or motivation in the prior art to select and combine the references that were relied on to show obviousness. The Examiner's Answer before the Board, plus a Supplemental Answer, stated that the combination of

Thunderchopper with Nortrup "would have been obvious to one of ordinary skill in the arts since the demonstration mode is just a programmable feature which can be used in many different device[s] for providing automatic introduction by adding the proper programming software," and that "another motivation would be that the automatic demonstration mode is user friendly and it functions as a tutorial." The Board adopted the examiner's answer, stating "the examiner has provided a well reasoned discussion of these references and how the combination of these references meets the claim limitations." However, perhaps recognizing that the examiner had provided insufficient justification to \*1342 support combining the Nortrup and Thunderchopper references, the Board held, as stated *supra*, that a "specific hint or suggestion" of motivation to combine was not required.

This appeal followed.

#### *Judicial Review*

[1] Tribunals of the PTO are governed by the Administrative Procedure Act, and their rulings receive the same judicial deference as do tribunals of other administrative agencies. *Dickinson v. Zurko*, 527 U.S. 150, 119 S.Ct. 1816, 144 L.Ed.2d 143, 50 USPQ2d 1930 (1999). Thus on appeal we review a PTO Board's findings and conclusions in accordance with the following criteria:

- 5 U.S.C. § 706(2) The reviewing court shall--  
(2) hold unlawful and set aside agency actions, findings, and conclusions found to be--  
(A) arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law;

\* \* \* \* \*

(E) unsupported by substantial evidence in a case subject to sections 556 and 557 of this title or otherwise reviewed on the record of an agency hearing provided by statute;

[2][3] For judicial review to be meaningfully achieved within these strictures, the agency tribunal must present a full and reasoned explanation of its decision. The agency tribunal must set forth its findings and the grounds thereof, as supported by the agency record, and explain its application of the law to the found facts. The Court has often explained:

The Administrative Procedure Act, which governs the proceedings of administrative agencies and related judicial review, establishes a scheme of "reasoned decisionmaking." Not only must an agency's decreed result be within the scope of its

lawful authority, but the process by which it reaches that result must be logical and rational. Allentown Mack Sales and Service, Inc. v. National Labor Relations Bd., 522 U.S. 359, 374, 118 S.Ct. 818, 139 L.Ed.2d 797 (1998) (citation omitted). This standard requires that the agency not only have reached a sound decision, but have articulated the reasons for that decision. The reviewing court is thus enabled to perform meaningful review within the strictures of the APA, for the court will have a basis on which to determine "whether the decision was based on the relevant factors and whether there has been a clear error of judgment." Citizens to Preserve Overton Park v. Volpe, 401 U.S. 402, 416, 91 S.Ct. 814, 28 L.Ed.2d 136 (1971). Judicial review of a Board decision denying an application for patent is thus founded on the obligation of the agency to make the necessary findings and to provide an administrative record showing the evidence on which the findings are based, accompanied by the agency's reasoning in reaching its conclusions. See In re Zurko, 258 F.3d 1379, 1386, 59 USPQ2d 1693, 1697 (Fed.Cir.2001) (review is on the administrative record); In re Gartside, 203 F.3d 1305, 1314, 53 USPQ2d 1769, 1774 (Fed.Cir.2000) (Board decision "must be justified within the four corners of the record").

[4][5] As applied to the determination of patentability *vel non* when the issue is obviousness, "it is fundamental that rejections under 35 U.S.C. § 103 must be based on evidence comprehended by the language of that section." In re Grasselli, 713 F.2d 731, 739, 218 USPQ 769, 775 (Fed.Cir.1983). The essential factual evidence on the issue of obviousness is set forth in Graham v. John Deere Co., 383 U.S. 1, 17-18, 86 S.Ct. 684, 15 L.Ed.2d 545, 148 USPQ 459, 467 (1966) and extensive ensuing precedent. The patent examination \*1343 process centers on prior art and the analysis thereof. When patentability turns on the question of obviousness, the search for and analysis of the prior art includes evidence relevant to the finding of whether there is a teaching, motivation, or suggestion to select and combine the references relied on as evidence of obviousness. See, e.g., McGinley v. Franklin Sports, Inc., 262 F.3d 1339, 1351-52, 60 USPQ2d 1001, 1008 (Fed.Cir.2001) ("the central question is whether there is reason to combine [the] references," a question of fact drawing on the Graham factors).

[6] "The factual inquiry whether to combine references must be thorough and searching." *Id.* It must be based on objective evidence of record. This precedent has been reinforced in myriad decisions,

and cannot be dispensed with. See, e.g., Brown & Williamson Tobacco Corp. v. Philip Morris Inc., 229 F.3d 1120, 1124-25, 56 USPQ2d 1456, 1459 (Fed.Cir.2000) ("a showing of a suggestion, teaching, or motivation to combine the prior art references is an 'essential component of an obviousness holding' ") (quoting C.R. Bard, Inc. v. M3 Systems, Inc., 157 F.3d 1340, 1352, 48 USPQ2d 1225, 1232 (Fed.Cir.1998)); In re Dembicza, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed.Cir.1999) ("Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references."); In re Dance, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed.Cir.1998) (there must be some motivation, suggestion, or teaching of the desirability of making the specific combination that was made by the applicant); In re Fine, 837 F.2d 1071, 1075, 5 USPQ2d 1596, 1600 (Fed.Cir.1988) ("'teachings of references can be combined *only* if there is some suggestion or incentive to do so.'") (emphasis in original) (quoting ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed.Cir.1984)).

The need for specificity pervades this authority. See, e.g., In re Kotzab, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1317 (Fed.Cir.2000) ("particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed"); In re Rouffet, 149 F.3d 1350, 1359, 47 USPQ2d 1453, 1459 (Fed.Cir.1998) ("even when the level of skill in the art is high, the Board must identify specifically the principle, known to one of ordinary skill, that suggests the claimed combination. In other words, the Board must explain the reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious."); In re Fritch, 972 F.2d 1260, 1265, 23 USPQ2d 1780, 1783 (Fed.Cir.1992) (the examiner can satisfy the burden of showing obviousness of the combination "only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references").

[7][8][9] With respect to Lee's application, neither the examiner nor the Board adequately supported the selection and combination of the Nortrup and Thunderchopper references to render obvious that

which Lee described. ~~The examiner's conclusory statements~~ that "the demonstration mode is just a programmable feature which can be used in many different device[s] for providing automatic introduction by adding the proper programming software" and that "another motivation would be that the automatic demonstration mode is user friendly and it functions as a tutorial" ~~do not adequately address the issue of motivation to combine.~~ This factual question \*1344 of motivation is material to patentability, and could not be resolved on subjective belief and unknown authority. It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to "[use] that which the inventor taught against its teacher." *W.L. Gore v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed.Cir.1983). Thus the Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion.

[10] Deferential judicial review under the Administrative Procedure Act does not relieve the agency of its obligation to develop an evidentiary basis for its findings. To the contrary, the Administrative Procedure Act reinforces this obligation. *See, e.g., Motor Vehicle Manufacturers Ass'n v. State Farm Mutual Automobile Ins. Co.*, 463 U.S. 29, 43, 103 S.Ct. 2856, 77 L.Ed.2d 443 (1983) ("the agency must examine the relevant data and articulate a satisfactory explanation for its action including a 'rational connection between the facts found and the choice made.'") (quoting *Burlington Truck Lines v. United States*, 371 U.S. 156, 168, 83 S.Ct. 239, 9 L.Ed.2d 207 (1962)); *Securities & Exchange Comm'n v. Chener Corp.*, 318 U.S. 80, 94, 63 S.Ct. 454, 87 L.Ed. 626 (1943) ("The orderly function of the process of review requires that the grounds upon which the administrative agency acted are clearly disclosed and adequately sustained.").

[11] In its decision on Lee's patent application, the Board rejected the need for "any specific hint or suggestion in a particular reference" to support the combination of the Nortrup and Thunderchopper references. Omission of a relevant factor required by precedent is both legal error and arbitrary agency action. *See Motor Vehicle Manufacturers*, 463 U.S. at 43, 103 S.Ct. 2856 ("an agency rule would be arbitrary and capricious if the agency ... entirely failed to consider an important aspect of the problem"); *Mullins v. Department of Energy*, 50 F.3d 990, 992 (Fed.Cir.1995) ("It is well established that

agencies have a duty to provide reviewing courts with a sufficient explanation for their decisions so that those decisions may be judged against the relevant statutory standards, and that failure to provide such an explanation is grounds for striking down the action."). As discussed in *National Labor Relations Bd. v. Ashkenazy Property Mgt. Corp.*, 817 F.2d 74, 75 (9th Cir.1987), an agency is "not free to refuse to follow circuit precedent."

[12] The foundation of the principle of judicial deference to the rulings of agency tribunals is that the tribunal has specialized knowledge and expertise, such that when reasoned findings are made, a reviewing court may confidently defer to the agency's application of its knowledge in its area of expertise. Reasoned findings are critical to the performance of agency functions and judicial reliance on agency competence. *See Baltimore and Ohio R.R. Co. v. Aberdeen & Rockfish R.R. Co.*, 393 U.S. 87, 91-92, 89 S.Ct. 280, 21 L.Ed.2d 219 (1968) (absent reasoned findings based on substantial evidence effective review would become lost "in the haze of so-called expertise"). The "common knowledge and common sense" on which the Board relied in rejecting Lee's application are not the specialized knowledge and expertise contemplated by the ~~Administrative Procedure Act~~. Conclusory statements such as those here provided do not fulfill the agency's obligation. This court explained in *Zurko*, 258 F.3d at 1385, 59 USPQ2d at 1697, that "deficiencies of the cited references cannot be remedied by the Board's general conclusions about what is 'basic knowledge' or 'common sense.' " The \*1345 Board's findings must extend to all material facts and must be documented on the record, lest the "haze of so-called expertise" acquire insulation from accountability. "Common knowledge and common sense," even if assumed to derive from the agency's expertise, do not substitute for authority when the law requires authority. *See Allentown Mack*, 522 U.S. at 376, 118 S.Ct. 818 ("Because reasoned decisionmaking demands it, and because the systemic consequences of any other approach are unacceptable, the Board must be required to apply in fact the clearly understood legal standards that it enunciates in principle....")

The case on which the Board relies for its departure from precedent, *In re Bozek*, 57 C.C.P.A. 713, 416 F.2d 1385, 163 USPQ 545 (1969), indeed mentions "common knowledge and common sense," the CCPA stating that the phrase was used by the Solicitor to support the Board's conclusion of obviousness based on evidence in the prior art. *Bozek* did not hold that common knowledge and common sense are a

substitute for evidence, but only that they may be applied to analysis of the evidence. Bozek did not hold that objective analysis, proper authority, and reasoned findings can be omitted from Board decisions. Nor does Bozek, after thirty-two years of isolation, outweigh the dozens of rulings of the Federal Circuit and the Court of Customs and Patent Appeals that determination of patentability must be based on evidence. This court has remarked, in Smiths Industries Medical Systems, Inc. v. Vital Signs, Inc., 183 F.3d 1347, 1356, 51 USPQ2d 1415, 1421 (Fed.Cir.1999), that Bozek's reference to common knowledge "does not in and of itself make it so" absent evidence of such knowledge.

[13][14][15][16] The determination of patentability on the ground of unobviousness is ultimately one of judgment. In furtherance of the judgmental process, the patent examination procedure serves both to find, and to place on the official record, that which has been considered with respect to patentability. The patent examiner and the Board are deemed to have experience in the field of the invention; however, this experience, insofar as applied to the determination of patentability, must be applied from the viewpoint of "the person having ordinary skill in the art to which said subject matter pertains," the words of section 103. In finding the relevant facts, in assessing the significance of the prior art, and in making the ultimate determination of the issue of obviousness, the examiner and the Board are presumed to act from this viewpoint. Thus when they rely on what they assert to be general knowledge to negate patentability, that knowledge must be articulated and placed on the record. The failure to do so is not consistent with either effective administrative procedure or effective judicial review. The board cannot rely on conclusory statements when dealing with particular combinations of prior art and specific claims, but must set forth the rationale on which it relies.

#### *Alternative Grounds*

At oral argument the PTO Solicitor proposed alternative grounds on which this court might affirm the Board's decision. However, as stated in Burlington Truck Lines, Inc. v. United States, 371 U.S. 156, 168, 83 S.Ct. 239, 9 L.Ed.2d 207 (1962), "courts may not accept appellate counsel's *post hoc* rationalization for agency action." Consideration by the appellate tribunal of new agency justifications deprives the aggrieved party of a fair opportunity to support its position; thus review of an administrative decision must be made on the grounds relied on by

the agency. "If those grounds are inadequate or improper, the court is powerless to affirm the administrative action by substituting what it considers \*1346 to be a more adequate or proper basis." Securities & Exchange Comm'n v. Chenery Corp., 332 U.S. 194, 196, 67 S.Ct. 1575, 91 L.Ed. 1995 (1947). As reiterated in Federal Election Comm'n v. Akins, 524 U.S. 11, 25, 118 S.Ct. 1777, 141 L.Ed.2d 10 (1998), "If a reviewing court agrees that the agency misinterpreted the law, it will set aside the agency's action and remand the case--even though the agency (like a new jury after a mistrial) might later, in the exercise of its lawful discretion, reach the same result for a different reason." Thus we decline to consider alternative grounds that might support the Board's decision.

#### *Further Proceedings*

[17] Sound administrative procedure requires that the agency apply the law in accordance with statute and precedent. The agency tribunal must make findings of relevant facts, and present its reasoning in sufficient detail that the court may conduct meaningful review of the agency action. In Radio-Television News Directors Ass'n v. FCC, 184 F.3d 872 (D.C.Cir.1999) the court discussed the "fine line between agency reasoning that is 'so crippled as to be unlawful' and action that is potentially lawful but insufficiently or inappropriately explained," quoting from Checkosky v. Securities & Exch. Comm'n, 23 F.3d 452, 464 (D.C.Cir.1994); the court explained that "[i]n the former circumstance, the court's practice is to vacate the agency's order, while in the latter the court frequently remands for further explanation (including discussion of the relevant factors and precedents) while withholding judgment on the lawfulness of the agency's proposed action." Id. at 888. In this case the Board's analysis of the Lee invention does not comport with either the legal requirements for determination of obviousness or with the requirements of the Administrative Procedure Act that the agency tribunal set forth the findings and explanations needed for "reasoned decisionmaking." Remand for these purposes is required. See Overton Park, 401 U.S. at 420-421, 91 S.Ct. 814 (remanding for further proceedings appropriate to the administrative process).

#### *VACATED AND REMANDED.*

277 F.3d 1338, 61 U.S.P.Q.2d 1430

END OF DOCUMENT